boilers periodically inspected, steam plant might also come within this range. The aim seems rather to extend the scope of trade unionism, which is commendable in principle, but must, if carried too far, be tyrannical, and as a consequence alienate the support of labourists as well as the pure economists.

Workers' Compensation.

The idea that the Workmen's Compensation Act is responsible for the increasing difficulty of elderly workers in finding employment has again been put forward—this time by Sir John Gray Hill at the International Law Association Congress. The fact is, however, that old men, instead of being more liable to accident than young men, are actually less liable. Their greater experience and caution more than makes up for their lessened agility. The Trade Unionist idea, as Mr. George Barnes, M.P., pointed out the other day, is that old men find special difficulty in getting employment, not on account of the Compensation Act, but because they are slow and cannot keep up with the requirements of modern workshops.

The C.E. Diploma.

(By John G. Kerr, M.A., LL.D.)

This department of the College is wide in its scope and aims at preparing its students for many demands. As indicative of these demands reference may be made to the operations of the great railway companies, two of which have their head offices in Glasgow, and to the Clyde Trust, by whom the River Clyde, a pleasant stream, 2ft. or so in depth at the Broomielaw a century ago, has been rendered navigable for ships of largest tonnage into the heart of the city. The Glasgow Corporation, with its magnificent and always developing water supply for over a million people, and its beneficent sewage scheme draining a densely populated industrial area of 41½ square miles, require a large staff of well-trained engineers, capable of dealing with the problems emerging from these enterprises, and skilled in executing the engineering work necessary for their satisfactory solution.

Lanarkshire, with its abounding wealth of coalfields, its prolific output of iron and steel, its countless engineering establishments, and particularly those devoted to structural and bridge-building work (made famous by the achievements of Sir William Arrol and those who follow in his footsteps), represents an imperative call for the best possible education in civil engineering science in all its aspects. Accordingly an outline of the provision which has been made by the Governors of the College to meet this call should prove of interest to the readers of "Engineering."

The diploma of civil engineering can be obtained by students attending a prescribed course covering a period of three winter sessions and one summer session, the interval between the second and third winter sessions being spent, if at all possible, on works under construction. The first winter is given, as in other diploma courses, to the study of pure science, and thereafter specialisation proceeds rapidly. Broadly stated, the students' work falls under the following heads:—(1) Descriptive lectures, (2) laboratory work, ((3) tutorial drawing-office design, (4) field-work, (5) reading and discussion of papers, and (6) visits to works in progress.

A titanic engine weighing one million pounds, capable of drawing any load of freight cars or coaches which will stand the strain on the drawing bars.

At first glance the suggestion may strike one as being absurd. But is it? Listen to this:

"It is probable that within a few years we shall see a 500-ton locomotive."

The statement was made by the superintendent of motive power of one of the largest railroad systems in America, a man who is acknowledged as one of the highest authorities.

Our Navy.

British Battleship Series.

(By "R.")

II.—The Duncan Class.

The example this week is of the "Cornwallis," one of the "Duncan" class. This is a class now consisting of five vessels. They did not immediately succeed the "Majestic" class, but may be taken as a good type of the kind of ship laid down about 1900. The displacement is 14,000 tons, a slight falling off from that of the "Majestic." The main armament is almost exactly the same, consisting of four 12-inch and twelve 6-inch, disposed as in the "Majestic." The only difference in the armament, indeed, is that the guns of the later vessel are of an improved type. The "Duncan's" speed is 19 knots, which represents an advance of 1½ knots on the speed of the "Majestic." This speed is obtained at a sacrifice of two inches of broadside armour, but in the later vessel the armour is Krupp. All the ships in the class are splendid steamers, and can be relied on for their 19 knots for a long time.

It is very dangerous to attempt to gauge the fighting efficiency of any ship of war simply by reference to her speed, the number of her guns and the thickness of her armour. One of the most important considerations is her age. An old ship is, *ipso facto,* inferior to a new one of apparently equal power in a hundred and one ways. Not merely has she probably fallen off considerably in speed, not merely are her guns probably more or less worn, but in a host of other ways she is less up to date. Improvements are constantly being made (they are made with almost every class, and even with the later ships of a single class) in such things as ammunition hoists, fire control, torpedoes, boilers, etc., and these improvements greatly add to the efficiency of a ship. The policy of the British Admiralty is against reconstruction. When the French will clean out an old ship, substitute new guns for her old, and fill her generally with the latest appliances, the British, as a general rule, prefer to build a new ship altogether. We have to remember, therefore, that the "Majestic" is not a more powerful vessel than the "Duncan" because she has the same armament and two inches more armour.

In appearance the main difference between the two classes is that whereas the "Majestic" has her funnels abreast, the "Duncan" has hers fore and aft, to which fashion the British Navy has ever since adhered. The "Majestic" has two tops on each mast; the "Duncan" has only one. There is no difference in the shape of the hull.

The "Indefatigable," armoured cruiser, has just been completed. She is an extremely powerful ship, carrying eight 12in. guns, all firing on the broadside, and designed to steam 26 knots. Twenty-eight knots is confidently expected of her. She displaces 18,000 tons. She is said, in addition, to be the ugliest ship in the Navy. This is mainly due to the remarkable appearance of her three funnels, which are all different in length, width, and shape. A difference in width and shape is no new thing. To take a familiar case, the "Powerful" has four funnels, one of which is round, two of which are broad oval, and one narrow oval. And some of the later Dreadnoughts have funnels of different width. But a difference in all three dimensions at once is certainly startling. Some of the papers say that the idea was to raise the fore funnel well above the navigating bridge, but none of them say what difficulty was experienced in raising all three, which would seem an obvious course.

Belonging to the same naval programme as the "Indefatigable," we have the battleship "Neptune." She, too, has just been completed and appears to have gone through her trials with every success. On the measured mile she attained a mean speed of 21.786 knots. With the tide she reached about a knot more as the maximum. The "Neptune" is our first completed "Dreadnought" to carry all her main guns (in this case ten 12in.) in such a way as to be able to use them all simultaneously on the broadside. This has been done by placing three pairs on the centre line, one forward and two aft, and *echeloning* two additional pairs amidships. She displaces 20,250 tons, and has a length of 510 feet.

A study of a photograph of the "Neptune" shows her to be a very ship-shape vessel. In no other vessel in the British Navy has the top hamper been cut down to such an extent. In appearance she is quite unlike any other Dreadnought. She has two tripod masts. Her two funnels are disposed, one close up against the foremast, and the other about half-way between the two masts. There are two box-like structures at the base of the masts, presumably containing conning-towers, etc.; there is a small boat deck running between the tops of these, and a small bridge forward; and this is absolutely all the superstructure she has besides her five turrets. One of the turrets, the fourth, is raised so as to be able to fire over the top of the fifth, and this gives her a nominal stern fire of eight 12in. It is never contemplated, however, with these superposed turrets that one shall fire directly over the other. The object of superposing is to allow a fire to be maintained much more nearly in a line with the lower turret than would otherwise be possible.

Apparently the age of "wonder ships" is not yet over. The "Dreadnought" was one, the "Indomitable" another, and the "Lion" another. Of course, these huge ships are more interesting from their very size than the smaller ones, but still we must all look forward with keen anticipation to the advent of the next scout, if, as *The Navy* says, she is to have new guns, new engines, new appearance, new protection and new dimensions.